

Wisely Managing Our Urban Water Resources

Neal Shapiro, City of Santa Monica

NPS Conference, Ventura, CA

November 5, 2003





### QUESTIONS, that want Answers

What water quality issues the City of Santa Monica addresses?

How does the City's urban runoff management program (URMP) manage that is, reduce, NPS pollution?

What funding mechanisms support the City's URMP?

What has worked and not worked? Why?

How does the URMP fit into the TMDL program?



### OBJECTIVES, the Answers

- Harvest stormwater for groundwater recharge and pollution treatment
- Connect land use/design to the Hydrologic Cycle, reducing the disconnect and disruption of water flow
- Mimic nature; land use blend in
- Take proactive, watershed approach to reducing urban runoff problems
- Convert a perceived "waste" into a valuable resource for reuse SMURRF
- Treat all dry weather and some wet weather urban runoff leaving the City



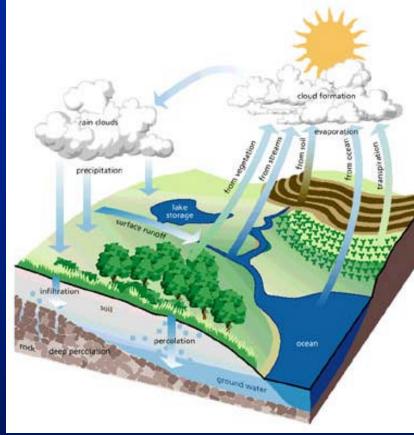
# Urban Runoff – What is it? The Problem – Water Quality v. Quantity

The Southern California Coastal Water Research Project, a leading marine research group in Southern CA, reported that storm water and urban runoff are the leading source of water pollution in the Los Angeles area; storm water pollution has increased 200-700 percent during the last 20 years.

- Stormwater has become a lethal cocktail of pollutants that now constitutes the single greatest source of water pollutants, contributing 50-60 percent of the pollutant load.
- Types and Sources of Pollutants
- According to the US EPA, urban stormwate the largest source of water quality damage is estuaries, the second largest for wetlands degradation, third largest impairment of lak and fourth largest source of river damage.

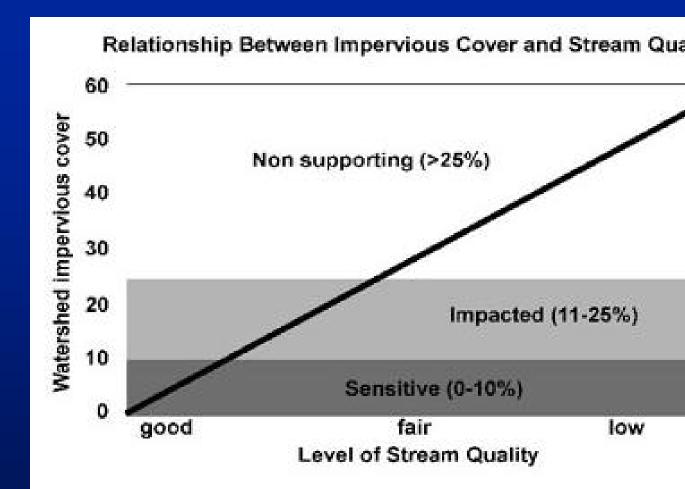
The Watershed Level – Disrupting the Water Cycle

Figure 4-1. Effects of Imperviousness on Runoff and Infiltration Natural Ground Cover 10-20% Impervious 38% Evapotranspiration Evapotranspiration 20% Runoff Infiltration 30-50% Impervious 75-100% Impervious 30% Evapotranspiration 5% Deep 10% Shallow Infiltration Infiltration Infiltration rce: Adapted from Arnold and Gibbons, 1996



How water flows through ou environment As hardscapes ncrease, water uality goes

lown.



Source: Schueler, T. 1994. The Importance of Imperviousnes In: <u>Watershed Protection Techniques</u> 1(3):100-111.





#### Paving Our Way to Water Shortages:

How Sprawl aggravates Drought







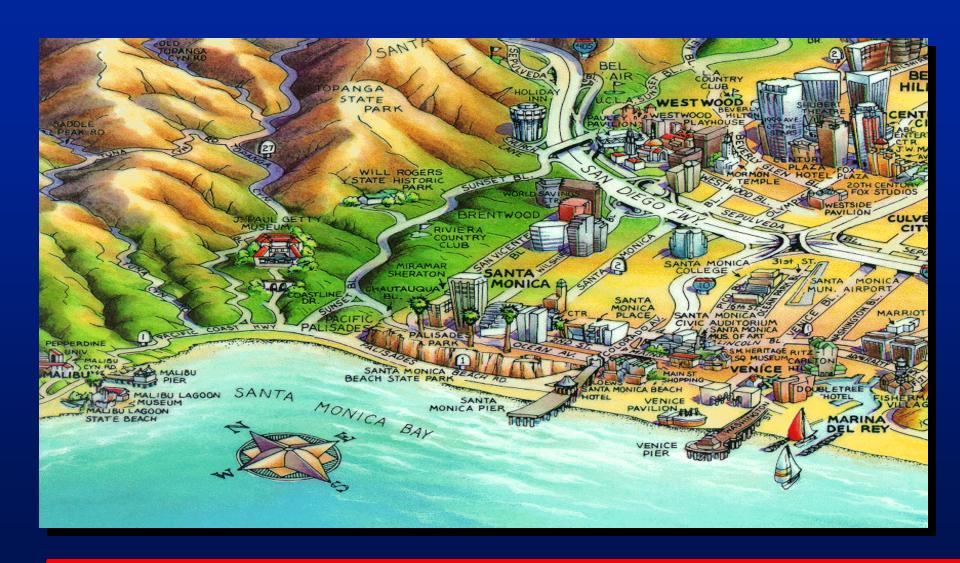


# Turning Impermeable to Permeable





### Santa Monica: Tourist Destination



## City Attractions











# An Environmentally Concerned Community



History of Political Activism

Concern Over the Environment





### Daily Breez **OUTLOOK EDITION**

May 26, 1991 \$1.00 Torrance, California 97th year/Number 145 @1991 The Copiey Press Inc.

ains, bay sickness

ed runoff after storms can sk of illness for swimmers

Tues swim

drains chance

symp-

fever,

, earvomit-

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School

ofessor

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Project

o study

urban

human

s carry

rs, gas

mal fe-

streets

\ngeles

a Bay make you sick?

long suspected it, health officials have skirted it, and many t even thought about it. ere is an answer to the long-asked question: Can swimming

NESS

Local tourism dampened by stream of bad news Visitor industry threatened by L.A. image



Venice m fund-rais

Art Walk set

### rning: Beach bacteria hazard often

els frequently exceed at some of the county's eaches, but health offiarn swimmers or close ed waters, the environ-

Health of region's

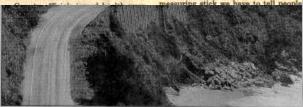
shores threatened

by urban runoff

Report card grades 48 beaches in tine violations." the South Bay, Westside./A9

end of Ballona Creek in Playa del Rey. But the county Department of Health Services has no policy to warn

"It's the only protection the swim mer has," Gold said. "It's the only



The coast along Big Sur. Some officials said while the results were troubling, the v

### **Beach Closings** Reach Record Levels in State

■ Environment: Survey finds 3,547 instances of pollution problems last year.

By SEEMA MEHTA

California's fabled coastline is far more polluted



Our This Times South noted

Assemblyman Nakano tells folks at Venice meeting bill would address pollution caused by older roads.

Laura Wides **OUR TIMES** 

VENICE - A panel of experts including state Assemblyman George Nakane alerted local residents Tuesday night to the dangers of polluted urban runoff and its effect on Los Angeles beaches.

The Democrat, who represents Venice and a number of South Bay communities, urged

#### TROUBLE IN THE BAY

Topanga Canyon Biv G 16801 Pacific Coast Hw C Chautaugua Blvd. Pulsa storm drai SANTA MONICA Senta Monica P Pice Blvd.\* O Ashland Ave. VENICE O Winds

MARINA DEL REY (3 Ballona Creek REDONDO BEACH

Herondo St.

Redondo pier

n-drain

elies on beach surveys conducted last sum who swam near the Ashland Avenue storr the Santa Monica Canyon storm drain at V er Beach near Malibu Creek. All three location

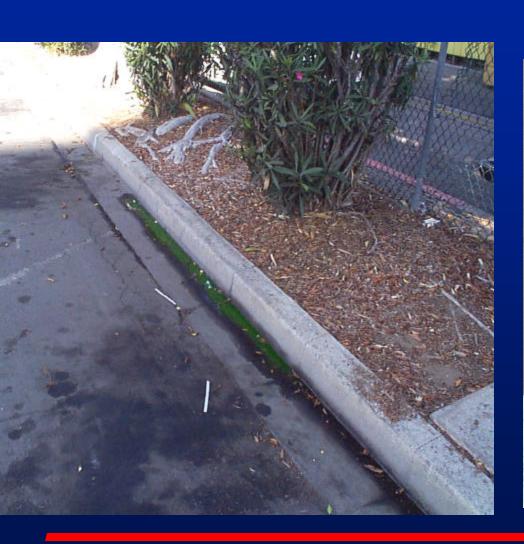
**By Harrison Sheppard** 

## Examples of Local Urban Runoff



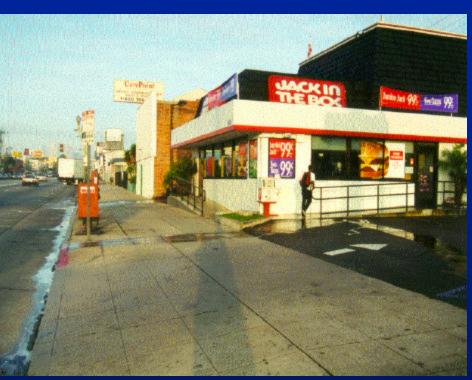


# Petroleum Derivatives



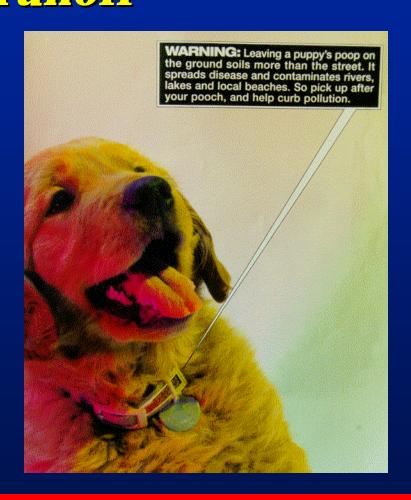


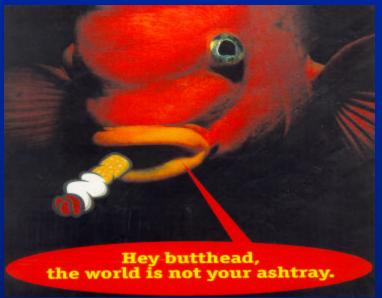
# Wash water & Fertilizers





# Even the little things contribute to urban runoff





Caltrans reports that 20% of the material removed from freeway storm drain inlets is cigarette butts (UCLA

Environmental Report Card 1999)

### City Staff Working Together to Do More with Less

Open Spaces -

Pets

Wastewater -CB/SD cleaning

Finance – parcel/runoff fees, grants

Engineering – BMP design in new projects; Airport gunite

> **Building &** Safety - COOs

Planning – start of new project

Utilities – ind. waste, recycled water

ource Management

Street Sweeping

GIS – mapping CB/SDs, BMP

locations

Solid Waste – recycling/trash spills

> Parks/Recs irrigation

City Attorneys – ordinances, enforcement, contracts

**Urban Runoff - EPD** 

Enforcement – wasting water, no BMPs, pollutant spills

### Tools of the Trade

- **Education**
- > Prevention
- **≻**Ordinances
- > Treatment
- **►** Maintenance
- **Enforcement**
- > Funding

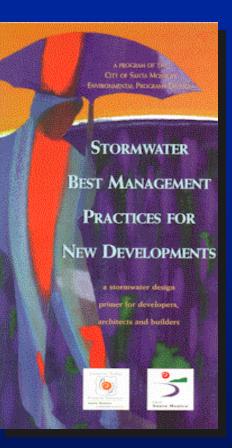


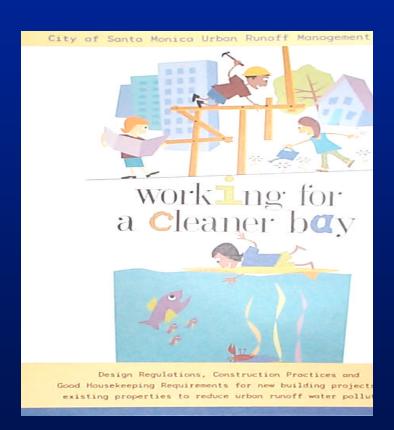
### **EDUCATION & PREVENTION**

- Brochures
- Radio / TV Spots
- Newspaper Articles/Ads
- City's Web Sites & Green Building Web Site
- Catch Basin Stencils/Tiles
- Educational Information at Facilities
- City Employee Training



### **Brochures and Handouts**









#### HEALING THE BAY - PET OWNER RESPONSIBILITIES

Owners of dogs and carts have the responsibility to pick up after their animal. Ideally, animal droppings should be flashed down the toilet, second best is in the garbage. It's not only the responsible thing to do, it's the law. For owners are required to carry a windle means of removing their potal droppings and can be fixed for their failure to do to (SMMC ABLTM, ABLEM and ABLEM). Why is this takes important to you, your resignbors and realisers of Santa Monion? Let's start with this statistic from the Los Aggiets County Department of Public Works.

Each mostle, more than 125,000 dog owners walk their dogs and repeatedly leave animal wante on the ground.

Many pet covners may not realize the environmental and health impacts these abandoned droppings have on the Santa Mosica Bay and health-poers. In fact, when beaches of the Bay receive poor grades from Heal the Bay's Beach Report Card, microorganisms found in animal wantes are often responsible. Whether left on a lawn or sidewalk, next to a true, or thrown into the street, rain and dry weather mostly from exterior wanting and analoscape irrigation pick up bacteria and other pathogens, such as E. Coll and Gardas, in droppings and carry them into the Bay, where people are wanting and restraing. People can get sick from exposure to these microorganisms. Colldren, resimmers and surfers are especially susceptible to lifness.

Besides City Iaws, the City is obligated under federal law through the State's Regional Water Quality Centrel Board to eliminate pollution found in urban runoff. These City and federal regulations strive to improve the quality of the Bay, our reopiest of urban ranoff pollutants. New regulations require each resident and visitor to be more vigilant in avoiding bad babits, such as leaving pet droppings. The simple act of cleaning, up to the post for in improving the quality of our like and beacher.

For evenery who do not pick up after their pert, the problem is multiplied as one animal can make a few deposits each few. What if the property owene or rester where the abundoned deposit is left doesn't clean up after the irrupososible pet owener? What about cars that roam firely and love deposits is the yards of neighbors where children play? Should not-pet owning or responsible pet-owning readents have to clean up after irresponsible pet owners?

And what about the feeling of stepping in an animal dropping, whether bare foot or not? How about madvertently tracking this meas into the bone? We know how difficult in it to pick out the smathed meas from the indentations of addictic and dress shows or clean the stain in a carpet. And then there is the small?

While the City has taken extraordinary measures to reduce urban russoff polizzion, pet owners need to help by renoving polizzion sources from landscapes and hard nurfaces.

For more information about urban runoff pollution and prevention, contact the City's Urban Runoff Management Coordinator, 458-8223, or Heal the Bay, 581-4188, www.healthebay.org.

PLEASE HELP THE BAY BY BEING A RESPONSIBLE PET OWNER.



### City's Web Site

www.santa-monica.org



### Green Building Web Site

greenbuildings.santa-monica.org

### Pier/Catch Basin Signage





### Pet Walk Parks



### ORDINANCES

- Urban Runoff Pollution Code
- Stormwater Utility Parcel Code
- Local Building Code
- Local Zoning Code
- Sustainable City Code

# Urban Runoff Mitigation, Stormwater Parcel Fee

- New Development & Runoff
  Mitigation Plan, including City
  projects
- **Retain 0.75**"
- Good Housekeeping BMPs
  - Construction Site BMPs
- Penalties \$500/day
- Flexibility
- In-Lieu Fee/Mitigation Banking

- New Development Threshold: Value of new construction is 50% or greater compared to the replacement cost of the existing improvement
- Stricter standard than LA Regional
   Water Board Standard
- About \$1.2 million annually

### Results Since 1993

- Number of Projects
- Single-Family: 240
- Multi-Family: 65
- Commercial: 70
- Unknown: 70
- City: 12
- BMP Ave. Costs: \$0.50 -\$3.50 per gallon, one-time
- <1.5% of total project cost</p>

- Design Storage (gallons)
- Single-Family: 184,000
- Multi-Family: 130,000
- Commercial: 342,000
- City: 100,000

## TREATMENT - Local

Catch Basin/Storm Drain Inserts



### Catch Basin Screens

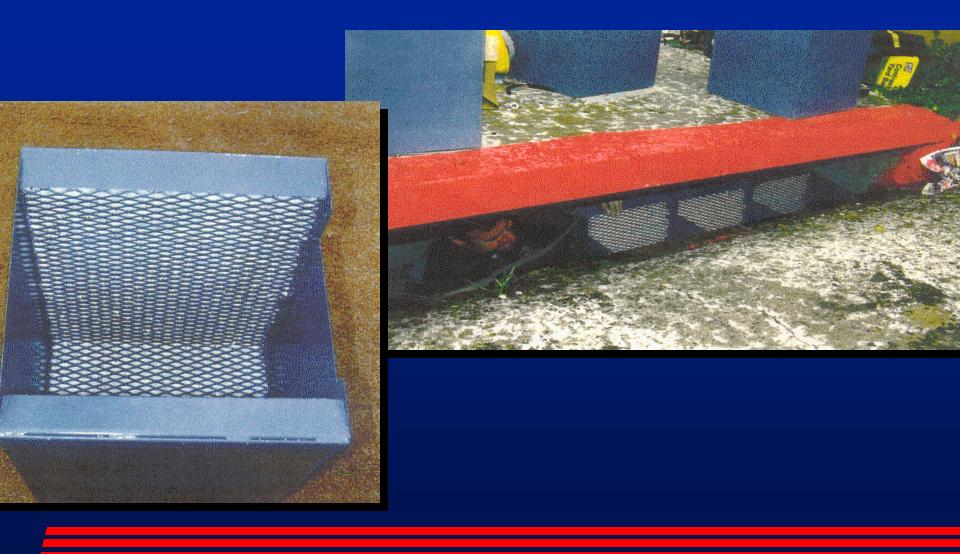




### Screening Catch Basin Insert



### Filtering Catch Basin Insert



### Onsite Basin with Trash Insert

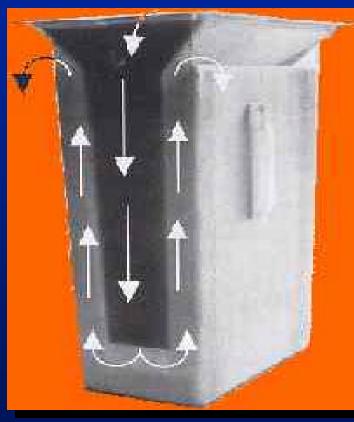






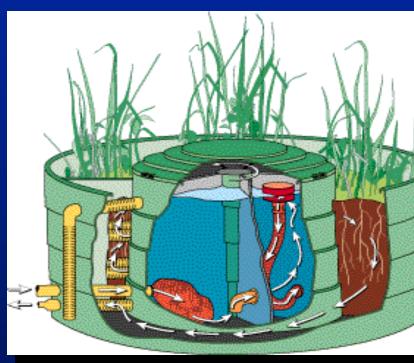
### Onsite Basin with Filter Insert





### Onsite Basin with Filter Insert

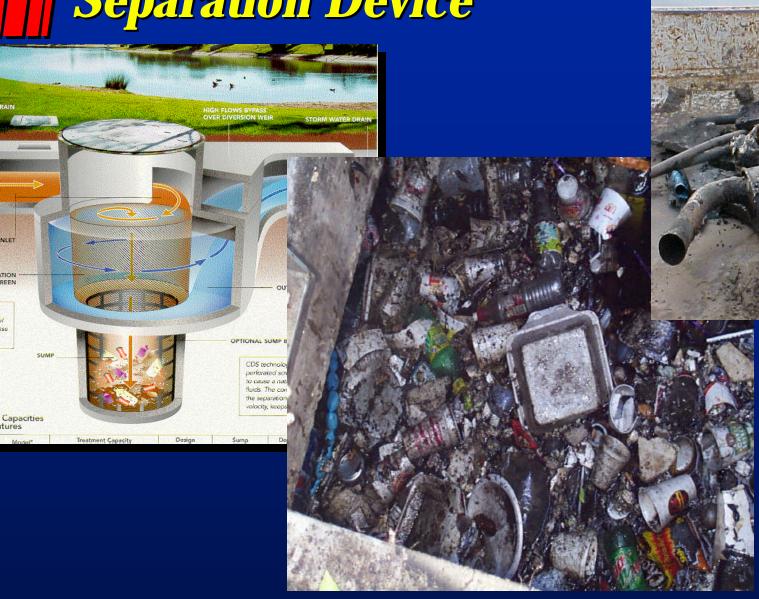




## TREATMENT – Large Area

- Separation and Filtering (in-line) Devices
- Devices installed as maintenance holes or diversion structures

### Separation Device



Trash, debris, sediments, oil, grease



# Filtering Device – solubles: metals, organics, nutrients



### Onsite Retention



**City Facilities** 



### Onsite Retention-private businesses





### Drywell BMPs-single/multi- family





#### **Infiltration Pits**





### **Onsite Retention**

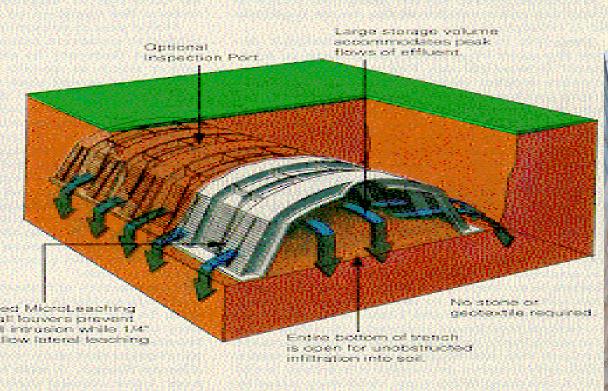


### Onsite Retention:





### Onsite Retention









# Permeable Paving

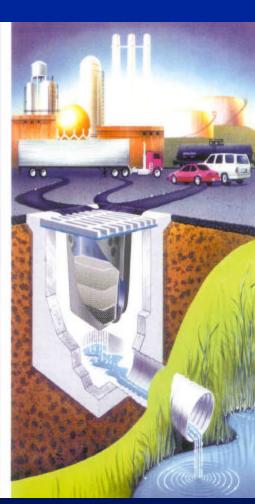




## Use of Parkways



- Price for a typical catch basin insert range from \$1500.00 to \$2500.00.
- Removes hydrocarbons, organically bound metals, PCB's, pesticides, VOC's, sulfides and other contaminating waste products from wet weather and industrial runoff.
- ·Certified laboratory tested.
- Recognized as a "Best Management Practice".
- Can be customized to remove site specific substances.
- Satisfies structural BMP requirements for NPDES compliance and most local regulations.
- Can replace most oil-water separators at a fraction of the cost.
- Retro-fit existing catch basins or customize for new drain systems.
- Can work with or without internal sedimentation chamber and/or in conjunction with other BMPs.
- Flexible installation for various catch basin sizes.
- Equipped with an overflow bypass to assure continued flow in the event of high volume storm events.
- Patented System.



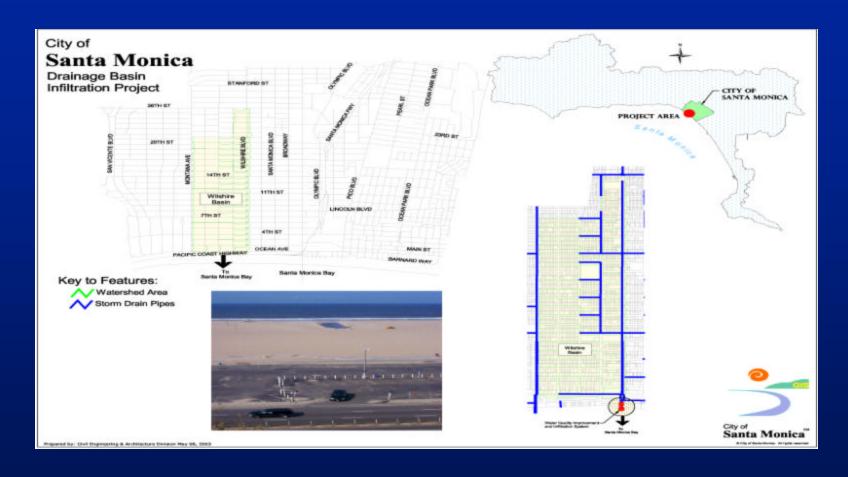




### Centinela Pico-Pearl Project



### Montana/Wilshire projects



### 16<sup>th</sup> street project

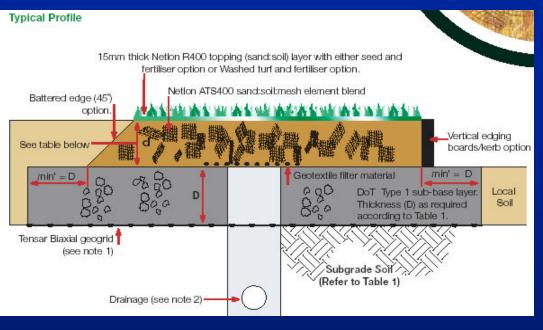


# Green Beaches project

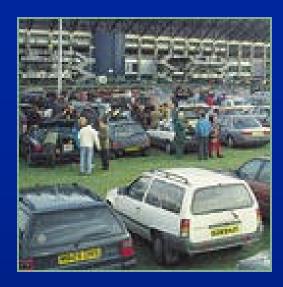














### Funding Mechanisms

Urban Runoff Ordinance, in lieu fees

Stormwater Utility fees

Grants: County: Proposition A, MTA

State: Proposition 12, Proposition 13

(multiple phases), Proposition 40, CA

Integrated Waste Management, PIE

Federal: ISTEA, Possible 319(h),

Possible Call for Projects, EPA Water

Initiative

MWD: ISA

Colorado one, possible



# **SMURRF**Santa Monica Urban Runoff Recycling Facility

Joint Santa Monica-Los Angeles Project

Reuse a local water resource.

Keep a pollution source out of Santa Monica Bay.

Reduce imported water supplies & mpacts on other watersheds.

Open, walk-through facility to ducate the public.

Up to 500,000 gallons/day, ave. is 25,000

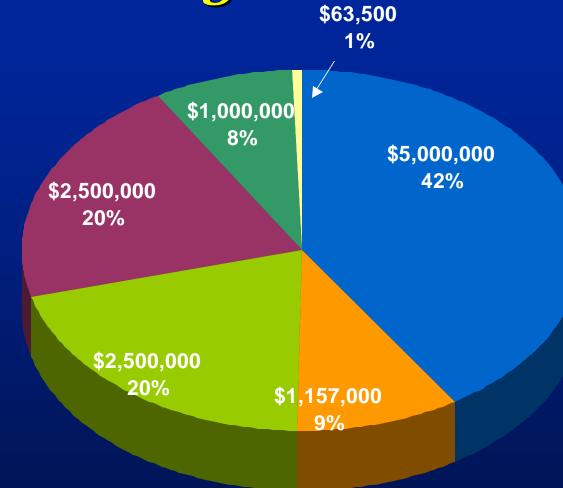
3% of City's daily water use.

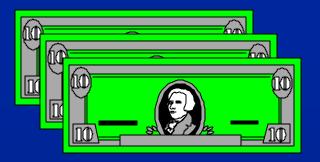
\$12 Million

\$175,000 O&M



### Funding Sources





- State Revolving Fund
- ISTEA
- City of Santa Monica
- **City of Los Angeles**
- LA County, Prop A
- In Lieu Urban Runoff

MWD Rebate: \$45,000 (credit) (estimated)

**Based on:** 

300 AFY of delivered water

@ \$150/AF

# Recommended Treatment for Reuse with Recycled Water



Trash

- Oil/Grease
- Turbidity

Pathogens

- Grit
- Suspended Solids

### Rotating Drum Screen





### **Grit Chamber**





### Dissolved Air Floatation

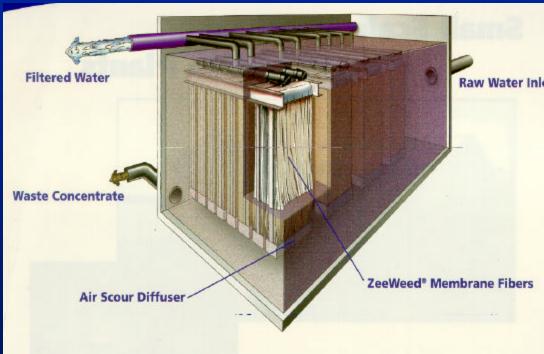


### Microfiltration









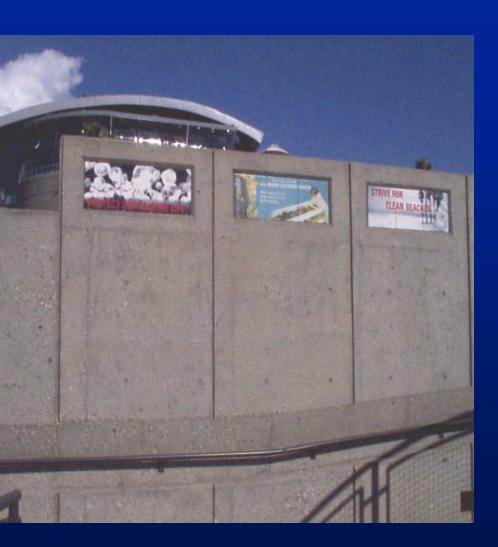
### **UV Radiation Channel**



### Finished Waterfall & Reservoir



# SMURRF Educational Panels







#### Water Quality Issues Addressed

Pollutants of Concern Found in Urban Runoff

Trash, Bacteria, Heavy Metals, Organics, Nutrients, Oil/Grease

All Dry Weather Flows

80% Wet Weather Flows (3/4" storm events)



BMPs designed to provide long-term treatment and compliance with NPDES and TMDL regulations and standards.

BMPs are dynamic in design, and multistage treatment train where appropriate

Pushing micro-watershed infiltration to comply with water quality regs and future local water supply



StormTreat: Arid climate v. Year-round rain

Catch Basin Inserts: O&M reality check, pick the right ones

Still have many projects to install so in the next few years, the City will gain more experience with new BMP systems

### What has Worked, Why

Vortex Separation-Screening: End of pipe, O&M, no moving parts & electricity, gravity-flow

Catch Basin Inserts: Select the right one for the right location, O&M program

Permeable Paving: Design and installation, O&M program

Recycling Facility: Design, O&M

**Post-Construction BMPs** 



Primary Strategy: Infiltration through Smart Growth, Low Impact Development strategies

Secondary Strategy: Multi-POC Treat & Release strategies

#### Thank You





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